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10/676,277	09/30/2003	A. Mufit Ferman	SLA1346 (7146.0164)	6561

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EXAMINER	
GE, YUZHEN	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/676,277	FERMAN, A. MUFIT	
	Examiner	Art Unit	
	YUZHEN GE	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/27/2008 has been entered.

Examiner's Remark

Applicant's amendment and affidavits, filed on 10/27/2008, has been received and entered into the file. Claims 1-23 are pending.

The affidavit by A. Mufit Ferman indicates that an Exhibit is attached to the declaration (Section 3), however, there is no Exhibit attached to the affidavit filed on 10/27/2008. The only exhibit filed is dated 1/25/2008.

The filing of the oath and declaration by A. Mufit Ferman under 131 and Mr. Kurt Rohlfs has removed the references of Jarmin as prior art and therefore the 102 and 103 rejections in the previous office action by or in view of Jarmin et al are hereby withdrawn.

A new ground of 102/103 rejection is introduced because of the removal of Jarmin's references as prior art. Also a new ground of 101 rejection is introduced because of a new 101 guideline (see below).

DETAILED ACTION

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-23 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent[1] and recent Federal Circuit decisions[2] indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example claims 1-23 do not explicitly tie to or recite any statutory category to carry out the steps of claims 1-23.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Benati et al (US Patent 5,748,764, cited by IDS).

Regarding claim 12, Benati et al teach a method to identify sub-regions of a multi-channel image containing red-eye (col. 4, lines 21-31), said multi-channel image having at least a first channel

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[1] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

[2] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

and a second channel (Fig. 5, first channel is hue and second channel is saturation, col. 4, lines 231-31), said method comprising:

(a) identifying a sub-region of said image as containing a red-eye region based upon, at least in part, applying a first mask to said first channel, said first mask comparing a first statistic of at least one pixel of said image to a first threshold (col. 4, lines 21-31, the first statistic is the hue value of a pixel, first threshold is either 700 or 1010, Fig. 6a, see also col. 3, lines 50-53, col. 5, lines 17-27, col. 4, lines 18-27, col. 5, lines 43-67, col. 8, lines 40-67); and

(b) applying a second mask to said second channel, said second mask comparing a second statistic of at least one pixel of said image to a second threshold, said second statistic being a different property than said first statistic (col. 4, lines 21-31, the second statistic is the saturation value of a pixel, the second threshold is either 65 or 256, the interpretation of statistic is as explained by the applicant in office action dated 7/7/2008, i.e., it can be pixel value, Fig. 6C),

Regarding claim 14, Benati et al teach the method of claim 12 wherein said first threshold is different than said second threshold (col. 4, lines 21-31, the thresholds for hue and saturation are different).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-5, 7-11, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schildkraut et al (US Patent 6,252,976, cited by IDS) in view of Koga et al (U S Patent 5,848,185).

Regarding claims 1, 7 and 23, Schildkraut et al teach a method to identify sub-regions of a multi-channel image (Fig. 2, S2 in Fig. 2, color image is multi-channel image) as containing a red-eye (Fig. 2) comprising:

converting and providing said multi-channel image (col. 9, lines 58-col. 10, line 10, RGB image is converted) to a modified multi-channel image wherein at least one of said channels is an enhanced luminance channel that has more than 60% of the luminance information of said multi-channel image (col. 9, line 58-col. 10, line 10, the luma channel is such an enhanced luminance channel) and at least one of said channel is a saturation channel (col. 9, line 58-col. 10, line 10); and

identifying a sub-region of said image as containing the red-eye region based upon, at least in part, processing said saturation channel (col. 10, lines 1-17 and col. 13, lines 4-12, the saturation is processed to obtain probability, see also Fig. 13).

However they do not explicitly teach applying a saturation mask to one or more pixels of said image, said saturation mask comparing the standard deviation of the saturation value of a respective pixel to a threshold and they do not explicitly identifying location variations in said saturation based upon the standard deviation of the saturation value of pixels in said channel that substantially includes said saturation.

In the same field of image segmentation and object detection, Koga et al teach applying a saturation mask to one or more pixels of said image, said saturation mask comparing the standard deviation of the saturation value of a respective pixel to a threshold (col. 15, lines 34-41, the saturation mask compares the variance of the saturation value of a respective pixel to a threshold which is equivalent to comparing the standard deviation of the saturation value to a threshold because the variance is square of the standard deviation, Fig. 13, the respective pixel is a pixel in the image segment) to determine whether an image segment is monochromatic or color (Fig. 13). Koga et al also teach identifying location variations in said saturation based upon the standard deviation of the saturation value of pixels in said channel that substantially includes said saturation (col. 15, lines 22-41, the variance is the square of standard deviation, and variance of the image segment represents the location variations of standard deviation and variance in the image segment, Fig. 13). It is desirable to be efficient when detecting red-eye region by first focus on color region and detecting color region/segment. The method Koga et al is also a method to try in the method of Schildkraut et al with predictable results (In re KSR v. Teleflex Inc). Therefore it would have been obvious to one of the ordinary skill in the art, at the time of invention, to use the method of Koga et al to detect whether an image segment is color or monochromatic first and then to find skin area and red eye area on the color area so that red-eye detection is more efficient.

Regarding claim 2, Schildkraut et al and Koga et al teach the method of claim 1. Koga et al further teach wherein said standard deviation of said saturation value of a respective pixel is

measured relative to the mean saturation of pixels in a neighborhood local to said respective pixel (col. 15, lines 21-34, the neighborhood is the image segment).

Regarding claims 3 and 8, Schildkraut et al and Koga et al teach the method of claim 1 and claim 7. Schildkraut et al further teach wherein said modified multi-channel image has hue, saturation, and intensity channels (col. 9, lines 58-67, col. 10, lines 1-17, col. 13, lines 4-12).

Regarding claims 4 and 9, Schildkraut et al and Koga et al teach the method of claim 3 and 8. Schildkraut et al teach wherein said saturation channel represents the relative bandwidth of the visible output from a light source (col. 10, lines 1-11, the value of Sat by definition is the relative bandwidth of the visible output from a light source).

Regarding claims 5 and 10, Schildkraut et al and Koga et al teach the method of claim 4 and claim 9. Schildkraut et al further teach wherein said hue is substantially the wavelength within the visible-light spectrum at which the energy output from a source is the greatest (col. 10, lines 8-12, inherent from the definition of hue).

Regarding claim 11, Schildkraut et al and Koga et al teach the method of claim 7. Schildkraut et al further teach wherein each channel of said multi-channel image is processed differently to identify said sub-region of said image (col. 10, lines 11-20, the probability from processing hue, saturation and luma is different, Fig. 13).

7. Claims 13, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benati et al in view of Koga et al (U S Patent 5,848,185).

Regarding claim 13 (interpreted), Benati et al teach the method of claim 12 where said first statistic is the intensity value of said pixel in said first channel. However they do not explicitly teach a second statistic is the standard deviation of a pixel in a second channel. In the field of object detection and extraction, Koga et al teach applying a saturation mask to one or more pixels of an image, said saturation mask comparing the standard deviation of the saturation value of a respective pixel to a threshold (col. 15, lines 34-41, the saturation mask compares the variance of the saturation value of a respective pixel to a threshold which is equivalent to comparing the standard deviation of the saturation value to a threshold because the variance is square of the standard deviation, Fig. 13, the respective pixel is a pixel in the image segment). It is desirable to be efficient when detecting red-eye region by first focus on color region. Therefore it would have been obvious to one of the ordinary skill in the art, at the time of invention, to use the method of Koga et al in the method of Benati et al to detect and extract color image segment for red-eye detection so that more efficient detection and extraction can be achieved.

Regarding claim 15, Benati et al and Koga et al teach the method of claim 13. Koga et al further teach wherein said standard deviation of said saturation value of a respective pixel is measured relative to the mean saturation of pixels in a neighborhood local to said respective pixel (col. 15, lines 21-34, the neighborhood is the image segment).

Regarding claim 17, Benati et al and Koga et al teach the method of claim 13. Koga et al teach wherein said second channel represents saturation (col. 15, lines 34-41).

8. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benati et al in view of Liang et al (US Patent 6,678,413 B1).

Regarding claim 18, Benati et al teach the method of claim 17. However they do not teach the method comprising using a convex hull technique to identify contiguous regions. Liang et al teach a method comprising using a convex hull technique to identify contiguous regions when segmenting and identifying an object (col. 17, line 53-col. 18, line 6). It is desirable to represent and characterize an object by known techniques automatically (col. 3, lines 1-23 of Liang et al). Convex hull techniques are known to have the advantage of executing in linear time in a two-dimensional array as is usual in image processing. Therefore it would have been obvious to one of ordinary skill in the art, at the time of invention, to use the convex hull method of Liang et al to represent and identify contiguous regions in the method of Benati et al so that more efficient algorithm for red-eye detection can be developed.

Regarding claim 20, Benati et al teach a method to identify sub-regions of a multi-channel image as containing red-eye comprising:

(a) providing said multi-channel image comprising luminance (lightness, col. 4, lines 20-28, Fig. 6b), hue, and saturation channels, respectively wherein at least one of said channels

substantially includes the hue of said image (col. 4, lines 20-28, the hue channel, Figs. 6a and 6c); and

(b) identifying a sub-region of said image as containing a red-eye region based upon, at least in part:

(i) filtering out selective pixels of said image based upon a first mask applied to said luminance channel, said mask comparing the luminance value of respective pixels in said image to a first threshold (Fig. 6b, col. 4, lines 20-31, the derived values are filtered);

(iii) thereafter applying a second mask to said hue channel, said second mask comparing the hue value of respective pixels in a plurality of contiguous regions to a second threshold (Fig. 6a, col. 4, lines 20-31, again the derived values are filtered).

(iv) subdividing said plurality of contiguous regions into a plurality of contiguous sub-regions based upon said second mask and a connected component technique (col. 4, line 50-col. 5, line 4, the technique of grouping pixels is a connected component technique, each segment is a contiguous sub-region).

(v) filtering out the pixels in selective sub-region based upon a comparison of the aspect ratio of respective said sub-regions to a third threshold (col. 5, lines 1-21, eccentricity is equivalent to aspect ratio).

However they do not explicitly teach (ii) thereafter applying a convex hull technique to group remaining pixels of said image into a plurality of contiguous regions. Liang et al teach a method comprising using a convex hull technique to identify contiguous regions when segmenting and identifying an object and to group pixels of an image into a plurality of contiguous regions (col. 17, line 53-col. 18, line 6). Convex hull techniques are known to work

and therefore they can be used to segment regions as shown in Figs. 14-22 by Benati et al (In re KSR v. Teleflex Inc). Furthermore, convex hull techniques are known to have the advantage of executing in linear time in a two-dimensional array as is usual in image processing. It is desirable to represent and characterize an object by known techniques and be efficient in red-eye detection (col. 3, lines 1-23 of Liang et al). Therefore it would have been obvious to one of ordinary skill in the art, at the time of invention, to use the convex hull method of Liang et al to represent and identify contiguous regions in the method of Benati et al so that more efficient red-eye detection can be achieved.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Benati et al in view of Liang et al, further in view of Luo et al (US Patent 7,035,461).

Regarding claim 19, Benati et al and Liang et al teach the method of claim 18. However they do not explicitly teach wherein contiguous regions having a size less than a threshold are removed as potential red-eye regions, said threshold computed dynamically based on the size of the input image. In the same field of endeavor, Luo et al teach resizing the input image (Fig. 12, col. 14, line 55-col. 15, line 11, col. 16, lines 46-59) and comparing the contiguous regions of the resized image with a threshold and removing the regions having a size less than a threshold (col. 16, lines 7-14, Figs. 12-13). Depending on the size of the input image, the size of the red-eye is different also. Scaling the input image dynamically based on the size of the input image and then comparing the size of the contiguous regions with a threshold is equivalent to comparing the non-scaled contiguous region with a threshold that is dynamically computed based on the size of

the input image. It is desirable to be efficient and correct when detecting red-eye pixels by eliminating pixels that are impossible to be red eyes (col. 1, lines 46-51 of Luo et al). Therefore it would have been obvious to one of ordinary skill in the art, at the time of invention, to use the method of Luo et al in the method of Benati and Liang et al so that contiguous pixels are eliminated/removed as non red-eye pixels depending on the size of input image.

Examiner's comment

10. Claims 6, 16 and 21-22 cannot be rejected over the prior art. A statement of reasons that claims 6, 16 and 22 cannot be rejected over the prior art is presented in the previous office action dated Oct. 23, 2007 and will not be repeated here. The reason that claim 21 cannot be rejected over the prior art is as follows: The prior art fails to teach the listed claims each of which specifically comprises the following listed feature(s) in combination with other limitations in the claim:

Claim 21

-- the method of claim 20 including the step of applying a third mask to said saturation channel, said third mask comparing the standard deviation of the saturation value of respective pixels in said plurality of contiguous sub-regions to a fourth threshold.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YUZHEN GE whose telephone number is (571)272-7636. The examiner can normally be reached on 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yuzhen Ge/
Examiner, Art Unit 2624

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